

**SECTION 10**

**BOAT ELECTROFISHING PROPOSAL**

**SUBMITTED TO THE**

**NATIONAL MARINE FISHERIES SERVICE**

**BY THE**

**OREGON DEPARTMENT OF FISH AND WILDLIFE**

**A. Title:** Application for Permit for Scientific Purposes under the Endangered Species Act of 1973

**Project Name:** Fish Composition Surveys in the Columbia Basin in Oregon

**B. Species:**

Columbia River Chum ESU  
Lower Columbia Chinook ESU  
Upper Columbia Chinook Salmon Spring Run ESU  
Snake River Chinook Salmon Spring/Summer Run ESU  
Snake River Chinook Salmon Fall Run ESU  
Upper Willamette Chinook ESU  
Lower Columbia Coho ESU  
Lower Columbia Steelhead ESU  
Mid Columbia Steelhead ESU  
Upper Columbia Steelhead ESU  
Snake River Steelhead ESU  
Upper Willamette Steelhead ESU  
Snake River Sockeye Salmon ESU

**C. Application Date:** June 17, 2006

**D. Applicant Identity:**

Oregon Department of Fish and Wildlife  
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**E. Information on Personnel, Cooperators and Sponsors:**

**E.1. Principal Investigators and Field Supervisors (Resumes attached)**

Chris Knutsen	503/842-2741
Mark G. Wade	541/896-3294 ext 224
Jeffrey S. Ziller	541/726-3515 ext. 26
Rod French	541/296/4628

**E.2. Field Personnel:**

The following personnel will assist and be under the direct supervision of a Principal Investigator or Field Supervisor: Tom Murtagh, Steve Mamoyac, Keith Braun, Robert Bradley, Troy Laws, Karen Hans, Mark Nusom, Bart Debow, Kelly Reis, Erik Moberly, Vince Tranquilli, Chad Helms, Michael Hogansen.

**E.3. Funding Sources:** These activities will be conducted primarily with ODFW operating funds. The native rainbow and cutthroat trout PIT tagging project in the McKenzie Basin receives some funding through Salmon and Trout Advisory Council and other non-governmental sources. Two of the projects

receive federal aid through the Sport Fish Restoration Fund administered by the U.S. Fish and Wildlife Service. Contracts are renewed annually. The programs and their contract numbers are as follows:

Warmwater Game Fish Management Program - Contract Number F-108-R-26

**E.4. No contractor** will be used in these activities.

**E.5. Specimen Disposition:** Vouchers of non-listed fish species collected or occasional indirect kills of listed species are deposited in the Oregon State University Museum of Ichthyology, c/o Dr. Douglas Markle, (541) 737-1970, [douglas.markle@oregonstate.edu](mailto:douglas.markle@oregonstate.edu). Indirect kills of listed species which are not taken as voucher specimens will be returned to the water at the point of capture.

**E.6. No transport or long-term holding** will occur during the proposed activities.

**F. Project Description, Purpose, and Significance:**

GENERAL OVERVIEW: The Oregon Department of Fish and Wildlife conducts fish composition surveys in several water bodies that are habitat for listed fish. When the streams are small enough backpack electrofishing is employed, using the methodology that has been approved by NMFS. On larger water bodies, boat electrofishing is one of the survey methods that are used. The objective of the biological sampling generally is to determine the species present and their proportionate abundances and habitat preferences. These data are then used to estimate changes in population number and structure as well as the biological integrity of the sites. Repeat samples allow us to calculate statistical power of our indicators and confidence intervals around our population estimates.

**Proposed projects:**

There are 6 separate projects that are addressed in this application. They will be referred to in the application as follows:

1. Warmwater Game Fish Management
2. Natural production of spring Chinook in the Mohawk system.
3. Genetic characterization of rainbow trout in the Upper Willamette System.
4. District fish population sampling in the Upper Willamette Basin
5. Native rainbow (*Oncorhynchus mykiss*) and cutthroat (*O. clarki*) trout monitoring using passive integrated transponders (PIT tags) in the McKenzie River basin
6. Resident Redband Estimates in the Deschutes

Projects 1, 2, 3, and 6 are continuing from the previous permit. Projects 4 and 5 are new.

**F1 Warmwater Game Fish Management**

This is a statewide project, the following areas may be surveyed in the next five years:

- Willamette River mainstem Rm 25 to rm 187; primarily in backwater habitats.
- Columbia River mainstem Rm 8 to rm 146; primarily in backwater habitats, sloughs.
- Willamette Basin reservoirs including Foster, Green Peter, Blue River, Cougar, Fall Creek, Dexter, Lookout Point and Hills Creek reservoirs.

**F1.1. Justification of the objective(s):**

The objectives of the project are described in the Warmwater Game Fish Management federal aid contract agreement (Contract Number F-108-R-26) and summarized as follows:

Need: Determine trends in warmwater fish communities and answer long-term management questions for warmwater species statewide.

Objective: Provide information to facilitate long-term fish management decisions and direction; maintain current information on the status of warmwater fish communities, diet preference, habitats and angling to determine necessity of management changes.

Expected results and benefits:

- Evaluate management actions.
- Determine what angling regulation changes will enhance warmwater fish populations and benefit angling.
- Identify waters with potential for quality or trophy warmwater fisheries.
- Estimate effects of current restrictions on harvest of warmwater fish on native species of concern.
- Better understand biological and physical constraints on fish populations.
- Avoid unexpected declines in angling quality.
- Anticipate the need for angling regulation changes.
- Discover or verify illegal introductions of new fish species.
- Provide managers and anglers with current fish population information.
- Identify areas for future intensive investigations

Benefits to listed species:

Information obtained on fish population structure and species interactions will be used to design and implement management actions to benefit listed species.

**F1.2. Federal agency nexus:**

The proposed project uses federal funds provided to states under the Sports Fish Restoration Act to accomplish objectives of that program.

**F1.3. Broader significance:**

The proposed project implements the goals and objectives of the state Warmwater Game Fish Management Plan (OAR 635-500-0055 through 0066).

**F1.4. Relationships or similarities to other projects and programs:**

No other similar projects employing boat-electrofishing gear are being conducted. Fish population data collected using other methods, e.g. nets, angler creel surveys, is used to supplement data obtained by this project.

**F1.5. Justification for using listed species:**

Listed species are not targeted by this project, but may be present in mixed-species fish communities that are being studied.

**F2 Natural production of spring Chinook in the Mohawk system.**

**F2.1. Justification of the objective(s):**

We believe there was no natural reproduction by spring Chinook in the Mohawk system for many years. In an effort to reestablish natural reproduction, ODFW has been releasing hatchery produced spring Chinook salmon juveniles and adult spring Chinook salmon that are excess to broodstock needs at McKenzie hatchery in the upper portion of the Mohawk River since 1996. These fish spawn in the fall and during April and May, we propose to use seines, snorkeling, a hoop trap, backpack electrofishers [all covered by a 4(d) research limit] and a boat-mounted electrofisher, if conditions warrant, to detect the presence of naturally produced juvenile spring Chinook salmon in the Mohawk River between the mouth and RM 25.

**F2.2. Federal agency nexus:**

N/A

**F2.3. Broader significance:**

Locally based project.

**F2.4. Relationships or similarities to other projects and programs:**

Not applicable.

**F2.5. Justification for using listed species:**

The study is specifically looking for progeny of listed hatchery Chinook that spawned in the wild in order to document the success of the project.

**F3 Genetic characterization of rainbow trout in the Upper Willamette System.**

**F3.1. Justification of the objective(s):**

The District will be collecting samples of *O. mykiss* from several areas in the upper Willamette system for genetic analysis. Previous genetic sampling in 1998-99 has indicated upper Willamette rainbow trout have unique characteristics. We plan to build a more robust database of genetic samples to explore the significance of these characteristics and determine the distribution of these fish.

**F3.2. Federal agency nexus:**

N/A

**F3.3. Broader significance:**

This project will contribute to a statewide study on *O. mykiss*.

**F3.4. Relationships or similarities to other projects and programs:**

We will coordinate sampling with ODFW Research and others already sampling fish on the river.

**F3.5. Justification for using listed species:**

Listed species are not targeted by this project, but may be captured unintentionally.

**F4. District fish population sampling in the Upper Willamette Basin.**

**F4.1. Justification of the objective(s):**

ODFW proposes to use boat electro-fishing gear to collect important information on fish abundance, population status, genetics and disease in streams and lakes in the Upper Willamette Basin. Electrofishing is an efficient means of collecting samples for fish presence, size and abundance, species composition, disease sampling and other management related information. Backpack electrofishers are ineffective sampling tools for larger waterbodies, necessitating the use of a boat electrofisher for this project. Data collected will inform management decisions.

**F4.2. Federal agency nexus:**

N/A

**F4.3. Broader significance:**

This project continues fish population sampling necessary to contribute to effective management decisions.

**F4.4. Relationships or similarities to other projects and programs:**

We will coordinate sampling with ODFW Research and others already sampling fish on the river.

**F4.5. Justification for using listed species:**

Information will be collected on all fish encountered during sampling and this may include Chinook salmon, although they are not being specifically targeted.

**F5. Native rainbow (*Oncorhynchus mykiss*) and cutthroat (*O. clarki*) trout monitoring using passive integrated transponders (PIT tags) in the McKenzie River basin****F5.1. Justification of the objective(s):**

ODFW proposes to use boat electro-fishing gear to collect important information on rainbow and cutthroat trout abundance size composition and migration patterns in the mainstem McKenzie River from its confluence with the Willamette River upstream to Blue River. Although we plan on using anglers to capture most of the trout for marking and recapture, electrofishing will also be used as an efficient means of collecting samples for tagging, fish size and abundance, and species composition.

Passive integrated transponders, or PIT tags, will be used to individually mark and track fish. These tags will be used to passively track fish movements without multiple recapture and disturbance events. All trout captured will be scanned with a portable hand-held device to determine the tag code. The PIT tags we will use in this study are 23 mm long and will be surgically implanted into the body cavity or dorsal sinus of the fish, depending on its size. No listed salmon will be tagged.

Project Objectives: PIT tagging of native trout will be used to assess population size, distribution, migration timing, growth, age and year class strength

**F5.2. Federal agency nexus:**

N/A

**F5.3. Broader significance:**

This project contributes to information required to make effective management decisions, including potential changes to angling regulations.

**F5.4. Relationships or similarities to other projects and programs:**

We will coordinate sampling with ODFW Research and others already sampling fish on the river.

**F5.5. Justification for using listed species:**

Listed species are not the target for this project, but may be encountered unintentionally.

**F6. Resident Redband Estimates in the Deschutes.****F6.1. Justification of the objective(s):**

Primary project objective is to conduct modified Peterson mark-recapture population estimates on redband trout in Oregon's Deschutes River. Secondary objectives include using captured fish to determine growth, age, dietary preference, movement patterns, rate of predatory scars, hooking scars, and length weight relationships. This work is the continuation of redband trout population assessment work that was started in 1971. The proposed work is an extension of ongoing fisheries management on the Lower Deschutes River.

The project does not propose to directly handle listed Mid-Columbia ESU adult steelhead. As discussed below, it is possible that the proposed work may result in unintentional handling juvenile steelhead.

**F6.2. Federal agency nexus:**

Data generated by this work has been used by the U.S. Fish and Wildlife Service in assessing the ecological effects of various release strategies from Warm Springs National Fish Hatchery. The Bureau of Land Management, by virtue of being a majority land holder in the area, has used data generated by this work to make recommendations on various land management activities. End points of this work help the Federal Regulatory Energy Commission assess the environmental cost of relicensing hydroelectric projects in the subbasin.

### **F6.3. Broader significance:**

The proposed project yields data that helps a variety of regulatory agents assess the continued health of the lower 100 miles of the Deschutes River. The resident redband population plays a particularly important role in this regard since these fish do not leave the Deschutes River for a portion of their life history as do the anadromous species. The importance here is that population levels of these fishes can be used to validate or refute the hypothesis that fluctuations in anadromous species in the Deschutes River are the result of mortality pressures during their freshwater life history.

Earlier versions of this work were components of the overall research project on the Deschutes River. These results are presented in:

Schroeder, R.K. and L.H. Smith. 1989. Life history of rainbow trout and effects of angling regulations Deschutes River, Oregon. Information Report 89-6. Oregon Department of Fish and Wildlife. Portland, OR.

Lindsay, R.B., B.C. Jonasson, R.K. Schroeder, and B.C. Cates. 1989. Spring chinook salmon in the Deschutes River, Oregon. Information Report 89-4. Oregon Department of Fish and Wildlife. Portland, OR.

Jonasson, B.C. and R.B. Lindsay. 1988. Fall chinook salmon in the Deschutes River, Oregon. Information Report 88-6. Oregon Department of Fish and Wildlife. Portland OR.

This work has been extensively referenced in documents prepared for the Federal Energy Regulatory Commission by Portland General Electric and the Confederated Tribes of Warm Springs Reservation of Oregon for relicensing the Pelton/Round Butte hydroelectric project.

### **F6.4. Relationships or similarities to other projects and programs:**

The proposed project is one of a kind in the lower Deschutes River subbasin. Other state and federal agencies and NGO's look to us to provide this information.

### **F6.5. Justification for using listed species:**

Wild steelhead, the listed species in question, will not be the target of the proposed project; rather, they will be encountered unintentionally during the project. Adult summer steelhead are infrequently encountered during February and March electrofishing on the mainstem lower Deschutes River. Although it is difficult to distinguish juvenile steelhead from juvenile rainbow trout, project proponents believe, based on demonstrated habitat preferences and migrational behavior, that few juvenile steelhead are encountered.

## **G. Project Methodology:**

### **G1. Project Methodology: Warmwater Game Fish Management**

#### **G1.1. Duration of the project:**

The project is ongoing and expected to continue as long as there is funding to support it.

### **G1.2. Procedures and techniques:**

#### **G1.2.a. Method(s) of capture and of release:**

Reservoir habitat is stratified and sites are randomly or selectively chosen within each habitat type. Each site is fished using a Smith Root GPP 5 electrofisher mounted on an aluminum-hulled sled. The sites are normally fished with the boat running parallel with the shoreline for 1,000 seconds of electrofisher on-time or until a pre-selected section is completed. Stunned fish are recovered in a soft mesh dipnet. Fish may be continually processed while electrofishing is underway and released behind the forward-travelling boat or they may be held in a live-well until the sample section is completed and then processed. Each fish is removed from the holding tank, its species and length recorded, and then it is returned to the water alive.

This capture and release approach also applies to riverine situations, although sampling protocols will vary depending on project-specific objectives. For example, in the Lower Columbia River sites will be less structured initially with the intent to sample multiple areas and determine presence and relative abundance of warmwater species present. Some areas may have pre-existing sampling sites where previous sample protocol would be used for data consistency. Sites will typically be sloughs associated with the mainstem Columbia and in some instances sloughs associated with tidally influenced portions of stream mouths to determine the extent of warmwater fish use in a system. The sites will typically be fished for 1,000 seconds of electrofisher on-time or until a pre-selected section is completed.

#### **G1.2.b. Sampling schedule, including locations and dates if available**

Sampling under this project will be conducted annually from April 1 through December 31 in the following areas:

- Willamette River mainstem, Rm 25 to Rm 187 (HUCs 17090007 and 17090003); primarily in backwater habitats.
- Columbia River mainstem Rm 8 to Rm 146 (HUCs 17080006, 17080003, 17090012, 17080001, and 17070105); primarily in backwater habitats, sloughs.
- Willamette Basin reservoirs including Foster (17090006), Green Peter (17090006), Blue River (HUC 17090004), Cougar (HUC 17090004), Fall Creek (HUC 17090001), Dexter (HUC 17090001), Lookout Point (HUC 17090001) and Hills Creek reservoirs (HUC 17090001).
- Boat electrofishing may also be undertaken in the Upper Deschutes Basin HUC (17070301) where anadromous listed species are not currently present.

#### **G1.2.c Description of any tags:**

No marks or tags will be put on listed fish in these electrofishing surveys.

#### **G1.2.d. Use of any drugs:**

No drugs will be used in these electrofishing surveys.

#### **G1.2.e. Temporary holding:**

Holding times in a livewell vary from none to 40 minutes depending on the number of fish netted and whether they are processed while electrofishing is underway or held until the sample site is completed. Water in the holding tank is recirculated and/or replaced to keep it fresh and oxygenated. There will be no long-term holding or transport.

#### **G1.2.f. Samples to be taken from each individual:**

No samples will be taken from individuals of listed species.

### **G1.3. Possible alternatives to using the proposed methods:**



Other methods will be used, if possible, but boat electrofishing is the most effective method for sampling populations of largemouth and smallmouth bass, two of the primary species being studied under this project. In most sample areas boat electrofishing is also the only feasible method for sampling because of access and in-water habitat structure.

**G1.4. Potential for injury or mortality and steps to minimize adverse effects:**

During this project low numbers of juveniles of listed species may be exposed to electrical shock and potential injury. Where juveniles of listed species may be encountered we use the minimum electrofisher settings (30 Hz pulse rate, < 6 msec pulse width, and 500 V peak voltage) that will produce a taxis response without inducing tetanus. When individuals of listed species can be identified in the water, less than 20 per sample section are netted for positive identification and examination. The electrical output is interrupted to allow other individuals that remain in the water to immediately recover and escape with minimum exposure to electrical shock. A rough tally of listed species observed but not netted is kept for reporting purposes. If significant, or potentially significant, numbers of listed salmonids are encountered in a given area sampling will be discontinued at that immediate location and may be resumed at nearby locations.

Whenever possible, electrofishing procedures will follow NMFS protocols (*Guidelines for electrofishing waters containing salmonids listed under the endangered species act; 6/2000*). Many protocols for backpack shocking are applicable to the boat shocking conducted as part of this project.

**G2. Project Methodology: Natural production of spring Chinook in the Mohawk system.**

**G2.1. Duration of the project:**

This is an ongoing project and is expected to continue until successful Chinook production is adequately verified.

**G2.2. Procedures and techniques:**

**G2.2.a. Method(s) of capture and of release:**

Sample sites are fished using an 18 foot aluminum drift boat equipped with a gas-generator powered Smith Root model GPP V. Because the conductivity of the Mohawk River is low (typically 50 to 80 siemens), the unit was adjusted to 60 pulses per second and 85% power. Stunned fish are recovered in a soft mesh dipnet. We remove each Chinook from a holding tank, record its species and length, then return it to the water.

**G2.2.b. Sampling schedule, including locations and dates if available**

Sampling takes place in the Mohawk River (HUC 17090004) between the mouth and RM 25, from April to June each year.

**G2.2.c. Description of any tags:**

No marks or tags will be put on listed fish in these electrofishing surveys.

**G2.2.d. Use of any drugs:**

No drugs will be used in these electrofishing surveys.

**G2.2.e. Temporary holding:**

Holding time in the livewell will be 15 minutes maximum. There will be no long-term holding or transport.

**G2.2.f. Samples to be taken from each individual:**

No tissue samples will be taken from listed fish during these electrofishing surveys

**G2.3. Possible alternatives to using the proposed methods:**

Boat-mounted electrofishing will only be conducted after other sampling methods have failed to capture juvenile Chinook, so very few, juvenile spring Chinook are expected to be captured.

**G2.4. Potential for injury or mortality and steps to minimize adverse effects:**

Captured juvenile Chinook will be measured and immediately released. Boat-mounted electrofishing would be conducted before adult Chinook are present in the system.

Whenever possible, electrofishing procedures will follow NMFS protocols (*Guidelines for electrofishing waters containing salmonids listed under the endangered species act; 6/2000*). Many protocols for backpack shocking are applicable to the boat shocking conducted as part of this project.

**G3. Project Methodology: Genetic characterization of rainbow trout in the Upper Willamette System.****G3.1. Duration of the project:**

This is an ongoing project that began in 1998 with sporadic sampling since then. It is expected to continue until genetic samples have been collected on all rainbow populations and subpopulations.

**G3.2. Procedures and techniques:****G3.2.a. Method(s) of capture and of release:**

Sample sites are fished using an 18 foot aluminum drift boat equipped with a gas-generator powered Smith Root model GPP V. Because the conductivity of the McKenzie River is low (typically 50 to 80 siemens), the unit was adjusted to 60 pulses per second and 85% power. Stunned fish are recovered in a soft mesh dipnet.

**G3.2.b. Sampling schedule, including locations and dates if available**

Sampling takes place from March to May and after October each year. Key areas of interest include the mainstem McKenzie River (HUC 17090004), the North Fork Middle Fork Willamette (HUC 17090001), the Middle Fork Willamette (HUC 17090001) above and below Hills Creek Reservoir and the Coast Fork Willamette (HUC 17090002).

**G3.2.c. Description of any tags:**

No marks or tags will be put on listed fish in these electrofishing surveys.

**G3.2.d. Use of any drugs:**

No drugs will be used in these electrofishing surveys.

**G3.2.e. Temporary holding:**

Holding time in the livewell will be 15 minutes maximum. There will be no long-term holding or transport.

**G3.2.f. Samples to be taken from each individual:**

No tissue samples will be taken from listed Chinook during these electrofishing surveys

**G3.3 Possible alternatives to using the proposed methods:**

Other methods considered (i.e. nets, angling, shore based electrofishing) would likely be ineffective, or more intrusive than boat electrofishing due to the large size of the rivers to be sampled.

**G3.4. Potential for injury or mortality and steps to minimize adverse effects:**

Previous sampling experience has shown that a boat-mounted electrofisher can efficiently collect rainbow trout while handling few juvenile spring Chinook. Sampling would be conducted when and where adult spring Chinook salmon would not be commonly found in the system.

Whenever possible, electrofishing procedures will follow NMFS protocols (*Guidelines for electrofishing waters containing salmonids listed under the endangered species act; 6/2000*). Many protocols for backpack shocking are applicable to the boat shocking conducted as part of this project.

#### **G4 Project Methodology: District fish population sampling in the Upper Willamette Basin**

##### **G4.1 Duration of the project:**

This will be an ongoing project expected to continue as long as there is funding to support it.

##### **G4.2. Procedures and techniques:**

###### **G4.2.a. Method(s) of capture and of release:**

Sample sites are fished using an 18 foot aluminum drift boat equipped with a gas-generator powered Smith Root model GPP V. Because the conductivity of the Upper Willamette basin is low (typically 50 to 80 siemens), the unit was adjusted to 60 pulses per second and 85% power. Stunned fish are recovered in a soft mesh dipnet. We remove each fish from a holding tank, record its species and length, then return it to the water.

###### **G4.2.b Sampling schedule, including locations and dates if available**

Sampling may occur at any time of year, depending on target species. Sampling will be timed to avoid impacting adult spring Chinook. Sampling locations are as follows:

- 1) mainstem McKenzie River from its confluence with the Willamette River upstream to Clear Lake and including the Mohawk River, Blue River and Blue River Reservoir, South Fork McKenzie River and Cougar Reservoir, Leaburg Canal, Walterville Canal and Walterville Pond (HUC 17090004);
- 2) mainstem Willamette River from its confluence with the McKenzie River upstream to the confluence of the Coast Fork and Middle Fork Willamette rivers (HUC 17090003), the mainstem Middle Fork Willamette River upstream to river mile 75 (approximately 20 river miles above Hills Creek Reservoir), and including Fall Creek, Fall Creek Reservoir, Dexter Reservoir, Lookout Point Reservoir, and Hills Creek Reservoir (HUC 17090001);
- 3) mainstem Coast Fork Willamette River from its confluence with the Middle Fork Willamette River upstream to Cottage Grove Dam and including the Row River upstream to Dorena Dam (HUC17090002) .

###### **G4.2.c Description of any tags:**

No marks or tags will be put on listed fish in these electrofishing surveys.

###### **G4.2.d Use of any drugs:**

No drugs will be used in these electrofishing surveys.

###### **G4.2.e Temporary holding:**

Holding time in the livewell will be 15 minutes maximum. There will be no long-term holding or transport.

###### **G4.2.f Samples to be taken from each individual:**

No tissue samples will be taken from listed Chinook during these electrofishing surveys

##### **G4.3. Possible alternatives to using the proposed methods:**

Other methods considered (i.e. nets, angling, shore based electrofishing) would likely be ineffective, or more intrusive than boat electrofishing due to the large size of the rivers to be sampled.

**G4.4 Potential for injury or mortality and steps to minimize adverse effects:**

Boat electrofishing equipment will be primarily used in localized areas and over short periods of time, often not exceeding one day. Electrofishing boats will be used at times and/or in areas where adult spring Chinook won't be present. Electrofishing areas will be selected to minimize effects on juvenile spring Chinook that may be present in various year classes. All fish species captured will be enumerated, measured and released unharmed. Fish will be handled in a professional manner by experienced fish biologists only, and measures will be taken to ensure all fish survive. It is believed that fewer than 30 juvenile spring Chinook and no adult spring Chinook will be sampled.

Whenever possible, electrofishing procedures will follow NMFS protocols (*Guidelines for electrofishing waters containing salmonids listed under the endangered species act; 6/2000*). Many protocols for backpack shocking are applicable to the boat shocking conducted as part of this project.

**G5. Project Methodology: Native rainbow (*Oncorhynchus mykiss*) and cutthroat (*O. clarki*) trout monitoring using passive integrated transponders (PIT tags) in the McKenzie River basin**

**G5.1. Duration of the project:**

This will be an ongoing project expected to continue for at least 5-7 years.

**G5.2. Procedures and techniques:**

**G5.2.a. Method(s) of capture and of release:**

Sample sites are fished using an 18 foot aluminum drift boat equipped with a gas-powered Smith Root model GPP V. Because the conductivity of the McKenzie Basin is low (typically 50 to 80 siemens), the unit was adjusted to 60 pulses per second and 85% power. Stunned fish are recovered in a soft mesh dipnet. After tagging and recovery trout are released. No other species is handled.

**G5.2.b Sampling schedule, including locations and dates if available**

Sampling will take place in the mainstem McKenzie River (HUC 17090004) from RM 0 upstream to Blue River RM 57, from late October to early April annually.

**G5.2.c Description of any tags:**

No marks or tags will be put on listed fish in these electrofishing surveys.

**G5.2.d Use of any drugs:**

No drugs will be used in these electrofishing surveys.

**G5.2.e Temporary holding:**

Holding time in the livewell will be 15 minutes maximum. There will be no long-term holding or transport of listed species.

**G5.2.f Samples to be taken from each individual:**

No tissue samples will be taken from listed Chinook during these electrofishing surveys

**G5.3. Possible alternatives to using the proposed methods:**

Other methods considered (i.e. nets, angling, shore based electrofishing) would likely be ineffective, or more intrusive than boat electrofishing due to the large size of the mainstem McKenzie.

Increased angling effort may be necessary if boat electrofishing does not provide a large enough sample of fish to PIT tag. It may be necessary to focus sampling efforts on a portion of the river (below Leaburg Dam) early in the study if adequate numbers of fish cannot be tagged in a suitable time frame over the entire study area..

#### **G5.4 Potential for injury or mortality and steps to minimize adverse effects:**

Boat electrofishing equipment will be primarily used in localized areas and over short periods of time, often not exceeding one day. Electrofishing boats will be used at times and/or in areas where adult spring Chinook won't be present. Electrofishing areas will be selected to minimize effects on juvenile spring Chinook that may be present in various year classes. All fish species captured will be enumerated, measured and released unharmed. Fish will be handled in a professional manner by experienced fish biologists only, and measures will be taken to ensure all fish survive. It is believed that fewer than 30 juvenile spring Chinook and no adult spring Chinook will be sampled.

Whenever possible, electrofishing procedures will follow NMFS protocols (*Guidelines for electrofishing waters containing salmonids listed under the endangered species act; 6/2000*). Many protocols for backpack shocking are applicable to the boat shocking conducted as part of this project.

#### **G6. Project Methodology: Resident Redband Estimates in the Deschutes**

Listed species will not be used in the proposed project but rather, unintentionally encountered. Listed species are not exposed to the methodology described below. This description is provided so the reader may more fully understand the goals, objectives, and processes of the proposed project.

The project utilizes an electrofishing system mounted in a driftboat. The boat is controlled by an oarsman that moves the boat down the shoreline with the boat at right angles to the bank. A worker in the bow of the boat uses a foot switch to control the flow of current to the anode. When targeted redband trout exhibit positive galvanotaxis when subjected to the current flow, the bowman captures them with a soft-mesh dipnet. These fish are placed in an on-board live well with a recirculating system. Between one half and one mile of river bank is worked before stopping to work fish. Fish are tagged with an individually numbered Floy tag, biologically interrogated and released.

##### **G6.1. Duration of the project:**

This work is funded through a grant from the United States Fish and Wildlife Service Sport Fish Restoration, and is expected to be continued as long as funding remains available.

##### **G6.2. Procedures and techniques:**

###### **G6.2.a. Method(s) of capture and of release:**

As described above, fishes targeted by this project are captured by boat mounted electrofishing equipment. Fish are released into calm backwater areas to allow full recovery from the capture and tagging process.

###### **G6.2.b Sampling schedule, locations and dates:**

The proposed project is somewhat dependent on stream flow but generally starts 20 February and is completed no later than 15 March.

Locations (all within HUC 17070306):

Section 1. Trout Creek Rapids (river mile 86.9) to the mouth of the Warm Springs River (river mile 83.9), Deschutes River, Oregon

Section 2. Cove Creek (river mile 71.8) to 2 Springs Flat (river mile 68.8), Deschutes River, Oregon.

Section 3. Locked Gate (river mile 58.5) to Harpham Flat (river mile 55.5), Deschutes River, Oregon

Section 4. Jones Canyon (river mile 34.0) to Rattlesnake Canyon (river mile 31.0), Deschutes River, Oregon.

**G6.2.c. Description of any tags:**

Each captured redband trout greater than 18 cm fork length is tagged with an individually numbered Floy 68 B anchor tag in accordance with the manufactures' instructions. Workers tagging these redband trout have years of experience and have applied this type of tag to literally tens of thousands of fish. We have found this type of tag to exhibit a low loss rate and commonly make recapture of tags that have been at large several years.

**G6.2.d. Use of any drugs:**

Again, we must stress that no listed species will intentionally be handled by this project. No listed species will be intentionally exposed to any anesthetic procedure. The project encounters listed species unintentionally.

Redband trout are anesthetized using CO<sub>2</sub> delivered at specific rates into solution in the holding tank. The pH of the anesthetic solution is closely monitored and adjusted to maintain neutrality utilizing a buffering agent. The anesthetic solution is refreshed after each sample section.

**G6.2.e. Temporary holding:**

Targeted redband trout are rarely held onboard for more than 25 to 30 minutes. These fish are held onboard in a recirculating livewell. Captured redband trout are not transported or held for longer than described.

**G6.2.f. Samples to be taken from each individual:**

Scales are collected from a representative sample of redband trout for later age analysis in accordance with established procedures recognized by field workers to be consistent with recognized fish handling protocol.

**G6.3 Possible alternatives to using proposed methods:**

The Lower Deschutes River is a large river (typically between 3,500 to 5,000 cfs), and other methods considered (i.e. nets, angling, shore based electrofishing) would likely be ineffective, or more intrusive than boat electrofishing. In order to obtain a sample size necessary to make inferences about the population, boat electrofishing was selected because of its proven effectiveness on the Deschutes with minimal disturbance to other species.

**G6.4. Potential for injury or mortality and steps to minimize adverse effects:**

Proposed project does not target listed adult steelhead. When adult steelhead are encountered, the electrofishing process is immediately stopped and the fish is allowed to escape contact with the electric field. These measures appear to be very effective, particularly given the years of experience of our workers.

As regards juvenile steelhead captured unintentionally to this project, the goal of the project is to capture, biosample, tag and release alive redband trout. The success of the project and the accuracy and precision of the data generated by the project depends on tagged fish staying alive through time. It would be counterproductive to the project goals to not use the most effective measures possible to eliminate

mortality to any and all fish handled by the project. Unintentionally captured juvenile steelhead would benefit greatly from this overall desire to release captured fish alive.

Whenever possible, electrofishing procedures will follow NMFS protocols (*Guidelines for electrofishing waters containing salmonids listed under the endangered species act; 6/2000*). Many protocols for backpack shocking are applicable to the boat shocking conducted as part of this project.

## **H. Description and Estimates of Take: Tables for individual projects are attached at the end of this application.**

### **H.1 Recent status and trends of each ESU/species proposed to be taken:**

ODFW has provided to NOAA the latest data for all Oregon salmon and steelhead ESUs during the recently completed review of west coast salmonid ESUs.

### **H.2 Justification for all potential mortalities:**

All mortality is unintentional. The estimate of indirect mortality for fish taken by electrofishing is based on Principal Investigator's experience that observed mortality rate does not exceed 5% and consistent with the rate used for permits authorized under the 4(d) process. In recent sampling by boat electrofishing on the Willamette River for example, mortality rates of 0-5% were recorded (J. North Pers. Comm., Spring 2000). For comparison McMichael et.al. 1998 reported that mean electrofishing injury rate in *Onchorhynchus mykiss* samples captured in tributaries was 5.1%. It is expected that all the measures outlined to minimize impacts to listed species will result in substantially lower rates of indirect mortality. All evidence of mortalities associated with boat electrofishing will be reported to NMFS in annual reports and will contribute to a better understanding of impacts and refined estimates of mortality in the future

### **H.3 Details on how take estimates were derived**

Estimates of the number of fish to be captured are based on the Principal Investigator's experience of boat electrofishing and their knowledge of typical species abundance in the areas where they will be surveying.

### **H.4 USFWS listed species affected and take authority:**

Some projects have the potential to unintentionally encounter listed Oregon Chub and Columbia Basin bull trout. ODFW has authority to handle both species under a Cooperative Agreement with U.S. Fish and Wildlife Service signed 4/30/1986.

## **I. Transportation and Holding:**

No live listed fish will be transported and no listed fish will be held other than temporarily in any project.

## **J. Cooperative Breeding Program:**

The project does not include any cooperative breeding program; however, ODFW would be willing to participate in a cooperative breeding program and maintain or contribute data to a breeding program, if such action is requested and provided it does not violate Oregon statutes or rules.

## **K. Previous or Concurrent Activities Involving Listed Species:**

### **K.1. Previous federal permits**

This application is a renewal of #1318 currently held by the applicant. The applicant has previously held permit #1511. This permit was withdrawn when take of SONC coho using by backpack electrofishing was authorized under the 4(d) rule in 2006.

**K.2.a Species to which federal permits apply:**

Permit 1318 covered take of Lower Columbia Chinook ESU, Lower Columbia Steelhead ESU, Mid Columbia Steelhead ESU, Oregon Coast Coho ESU, Upper Willamette Chinook ESU, and Upper Willamette Steelhead ESU. Permit 1511 covered take of listed coho in the Southern Oregon/ Northern California Coho Salmon ESU.

**K.2.b Mortalities**

There have been no observed mortalities reported under either permit 1318 or 1511. Indirect mortalities reported under permit 1318 were estimated, but not observed.

**K.2.c. Measures to diminish or eliminate mortalities:**

Measures employed by the individual projects have been effective in minimizing or eliminating mortalities and will be continued as described under each project and as follows.

**K.2.c. Measures to diminish or eliminate mortalities:**

Measures that we have taken to diminish or eliminate mortalities include the following protocols, modifications to technique and training activities:

- a) To minimize electrofishing injury, we use a low pulse rate (30 pulses/s), a narrow pulse width (< 6 msec), and low peak voltage (500 V).
- b) We use of the hull of the aluminium boat as the cathode and two anode arrays with a total of 12 droppers. This allows the use of lower voltages with reduced field strength in the vicinity of the electrodes.
- c) Electrofishing procedures will follow NMFS protocols (Guidelines for electrofishing waters containing salmonids listed under the endangered species act; 6/2000).
- d) One field crew member (Eric Moberly) has attended the Principles and Techniques of Electrofishing training course offered by the U. S. Fish and Wildlife Service-National Conservation Training Center.
- e) Trainers from Smith-Root, Inc. have consulted with project staff to recommend equipment adjustments to reduce salmonid mortalities. Current levels of sampling effort are near minimum levels needed to detect differences in fish communities of study sites.
- f) General guidelines for fish field research of Nickum et al. will be followed.
- g) Boat electro-fishing is only conducted at times and in locations where adults of listed species are not normally present.
- h) For non-salmonid sampling projects, e.g., warmwater fish inventory, if significant numbers of juvenile salmonids are encountered sampling may cease, location may be modified, or timing may be modified to reduce or eliminate encounters.

**References Cited**

J. G. Nickum, Chair, H. L. Bart, Jr, P. R. Bowser, I. E. Greer, C. Hubbs, J. A. Jenkins, J. R. MacMillan, J. W. Rachlin, J. D. Rose, P. W. Sorensen, and J. R. Tomasso. 2004. Guidelines for Use of Fishes in Research. American Society of Ichthyologists and Herpetologists, American Fisheries Society & American Institute of Fisheries Research Biologists.



McMichael, G. Fritts, A.L. and Pearsons, T.N. 1998. Electrofishing Injury to stream salmonids; Injury Assessment at the Sample, Reach, and Stream Scales. North American Journal of Fisheries Management 18:894-904.

Oregon Administrative Rules (OAR). 1987 Warmwater Gamefish Management, OAR 635-500-0055 through 0060. Oregon Department of Fish and Wildlife.

## **12. Certification:**

I hereby certify that the foregoing information is complete, true and correct to the best of my knowledge and belief. I understand this information is submitted for the purpose of obtaining a permit under the Endangered Species Act of 1973 (ESA) and regulations promulgated thereunder, and that any false statement may subject me to the criminal penalties of 18 U.S.C. 1001, or to penalties under the ESA.

Signature

Mary L. Hanson

July 31, 2006

Name:

Mary L. Hanson

## H. Description and Estimate of Take

### H1. Warmwater Game Fish Management

ESU/ Species and population group if appropriate	Life Stage	Origin	Take Activity	Number of Fish Requested	Requested Unintentional Mortality	Research Location	Research Period
Upper Willamette Spring Chinook Salmon ESU	Juvenile	Natural	Capture/Handle/ Release	90	4	Willamette River mainstem RM 0 to RM 187; primarily in backwater habitats	April 1 through December 31 annually
Upper Willamette Spring Chinook Salmon ESU	Juvenile	Hatchery adipose clipped	Capture/Handle/ Release	90	4	Willamette River mainstem RM 0 to RM 187; primarily in backwater habitats	April 1 through December 31 annually
Upper Willamette Spring Chinook Salmon ESU	Juvenile	Natural	Capture/Handle/ Release	20	1	Foster Reservoir	April 1 through December 31 annually
Upper Willamette Spring Chinook Salmon ESU	Juvenile	Hatchery adipose clipped	Capture/Handle/ Release	20	1	Foster Reservoir	April 1 through December 31 annually
Upper Willamette Steelhead ESU	Juvenile	Natural	Capture/Handle/ Release	40	2	Willamette River mainstem RM 0 to RM 187; primarily in backwater habitats	April 1 through December 31 annually
Upper Willamette Steelhead ESU	Juvenile	Natural	Capture/Handle/ Release	20	1	Foster Reservoir	April 1 through December 31 annually
Lower Columbia River Chinook Salmon ESU	Juvenile	Natural	Capture/Handle/ Release	295	5	Columbia River ,RM 8 to RM 146 primarily in backwater, slough , estuarine habitats	April 1 through December 31 annually
Lower Columbia River Chinook Salmon ESU	Juvenile	Hatchery adipose clipped	Capture/Handle/ Release	20	1	Columbia River ,RM 8 to RM 146 primarily in backwater, slough , estuarine habitats	April 1 through December 31 annually
Lower Columbia River Chinook Salmon ESU	Juvenile	Hatchery unclipped adipose	Capture/Handle/ Release	100	5	Columbia River ,RM 8 to RM 146 primarily in backwater, slough , estuarine habitats	April 1 through December 31 annually
Lower Columbia River Steelhead ESU	Juvenile	Natural	Capture/Handle/ Release	20	1	Columbia River ,RM 8 to RM 146 primarily in backwater, slough , estuarine habitats	April 1 through December 31 annually
Lower Columbia River Steelhead ESU	Juvenile	Hatchery adipose clipped	Capture/Handle/ Release	40	1	Columbia River ,RM 8 to RM 146 primarily in backwater, slough , estuarine habitats	April 1 through December 31 annually
Lower Columbia Coho Salmon ESU	juvenile	Natural	Capture/Handle/R elease	50	2	Columbia River ,RM 8 to RM 146 primarily in backwater, slough , estuarine habitats	April 1 to June 30 annually
Lower Columbia Coho Salmon ESU	juvenile	Hatchery adipose clipped	Capture/Handle/R elease	150	7	Columbia River ,RM 8 to RM 146 primarily in backwater, slough , estuarine habitats	April 1 to June 30 annually
Lower Columbia Coho Salmon ESU	juvenile	Hatchery unclipped adipose	Capture/Handle/R elease	20	1	Columbia River ,RM 8 to RM 146 primarily in backwater, slough , estuarine habitats	April 1 to June 30 annually
Lower Columbia Chum Salmon ESU	juvenile	Natural	Capture/Handle/R elease	50	2	Columbia River ,RM 8 to RM 146 primarily in backwater, slough , estuarine habitats	April 1 to June 30 annually

Upper Willamette Spring Chinook Salmon ESU	Juvenile	Natural	Capture/Handle/Release	20	1	Molalla/Pudding River mainstem; RM 0-15	April 1 through December 31 annually
Upper Willamette Spring Chinook Salmon ESU	Juvenile	Hatchery adipose clipped	Capture/Handle/Release	20	1	Molalla/Pudding River mainstem; RM 0-15	April 1 through December 31 annually
Upper Willamette Spring Chinook Salmon ESU	Juvenile	Natural	Capture/Handle/Release	40	2	Clackamas River mainstem; RM 0-13; Primarily abandoned gravel mine & backwater habitat	April 1 through December 31 annually
Upper Willamette Spring Chinook Salmon ESU	Juvenile	Hatchery adipose clipped	Capture/Handle/Release	40	2	Clackamas River mainstem; RM 0-13; Primarily abandoned gravel mine & backwater habitat	April 1 through December 31 annually
Lower Columbia River Steelhead ESU	Juvenile	Natural	Capture/Handle/Release	20	1	Clackamas River mainstem; RM 0-13; Primarily abandoned gravel mine & backwater habitat	April 1 through December 31 annually
Lower Columbia River Steelhead ESU	Juvenile	Hatchery adipose clipped	Capture/Handle/Release	40	2	Clackamas River mainstem; RM 0-13; Primarily abandoned gravel mine & backwater habitat	April 1 through December 31 annually
Lower Columbia Coho Salmon ESU	juvenile	Natural	Capture/Handle/Release	50	2	Clackamas River mainstem; RM 0-13; Primarily abandoned gravel mine & backwater habitat	April 1 to June 30 annually
Lower Columbia Coho Salmon ESU	juvenile	Hatchery adipose clipped	Capture/Handle/Release	40	2	Clackamas River mainstem; RM 0-13; Primarily abandoned gravel mine & backwater habitat	April 1 to June 30 annually
Lower Columbia Coho Salmon ESU	juvenile	Hatchery unclipped adipose	Capture/Handle/Release	5	0	Clackamas River mainstem; RM 0-13; Primarily abandoned gravel mine & backwater habitat	April 1 to June 30 annually
Lower Columbia River Chinook Salmon ESU	Juvenile	Natural	Capture/Handle/Release	100	5	Willamette River mouth to Will. Falls primarily in backwater, slips, & sloughs	April 1 through December 31 annually
Lower Columbia River Chinook Salmon ESU	Juvenile	Hatchery adipose clipped	Capture/Handle/Release	100	5	Willamette River mouth to Will. Falls primarily in backwater, slips, & sloughs	April 1 through December 31 annually
Lower Columbia River Chinook Salmon ESU	Juvenile	Hatchery unclipped adipose	Capture/Handle/Release	20	1	Willamette River mouth to Will. Falls primarily in backwater, slips, & sloughs	April 1 through December 31 annually
Lower Columbia River Steelhead ESU	Juvenile	Natural	Capture/Handle/Release	20	1	Willamette River mouth to Will. Falls primarily in backwater, slips, & sloughs	April 1 through December 31 annually
Lower Columbia River Steelhead ESU	Juvenile	Hatchery adipose clipped	Capture/Handle/Release	40	1	Willamette River mouth to Will. Falls primarily in backwater, slips, & sloughs	April 1 through December 31 annually
Lower Columbia Coho Salmon ESU	juvenile	Natural	Capture/Handle/Release	50	2	Willamette River mouth to Will. Falls primarily in backwater, slips, & sloughs	April 1 to June 30 annually

Lower Columbia Coho Salmon ESU	juvenile	Hatchery adipose clipped	Capture/Handle/Release	150	7	Willamette River mouth to Will. Falls primarily in backwater, slips, & sloughs	April 1 to June 30 annually
Lower Columbia Coho Salmon ESU	juvenile	Hatchery unclipped adipose	Capture/Handle/Release	20	1	Willamette River mouth to Will. Falls primarily in backwater, slips, & sloughs	April 1 to June 30 annually
Upper Columbia Chinook Salmon Spring Run ESU	Juvenile	Natural	Capture/Handle/Release	5	0	Columbia River ,RM 8 to RM 146 primarily in backwater, slough , estuarine habitats	April 1 through December 31 annually
Upper Columbia Chinook Salmon Spring Run ESU	Juvenile	Hatchery Adipose Clipped	Capture/Handle/Release	10	0	Columbia River ,RM 8 to RM 146 primarily in backwater, slough , estuarine habitats	April 1 through December 31 annually
Snake River Chinook Salmon Spring/Summer Run ESU	Juvenile	Natural	Capture/Handle/Release	5	0	Columbia River ,RM 8 to RM 146 primarily in backwater, slough , estuarine habitats	April 1 through December 31 annually
Snake River Chinook Salmon Spring/Summer Run ESU	Juvenile	Hatchery Adipose Clipped	Capture/Handle/Release	10	0	Columbia River ,RM 8 to RM 146 primarily in backwater, slough , estuarine habitats	April 1 through December 31 annually
Snake River Chinook Salmon Fall Run ESU	Juvenile	Natural	Capture/Handle/Release	5	0	Columbia River ,RM 8 to RM 146 primarily in backwater, slough , estuarine habitats	April 1 through December 31 annually
Snake River Chinook Salmon Fall Run ESU	Juvenile	Hatchery Adipose Clipped	Capture/Handle/Release	10	0	Columbia River ,RM 8 to RM 146 primarily in backwater, slough , estuarine habitats	April 1 through December 31 annually
Snake River Sockeye Salmon ESU	Juvenile	Natural	Capture/Handle/Release	2	0	Columbia River ,RM 8 to RM 146 primarily in backwater, slough , estuarine habitats	April 1 through December 31 annually
Snake River Sockeye Salmon ESU	Juvenile	Hatchery Adipose Clipped	Capture/Handle/Release	2	0	Columbia River ,RM 8 to RM 146 primarily in backwater, slough , estuarine habitats	April 1 through December 31 annually
Upper Columbia Steelhead ESU	Juvenile	Natural	Capture/Handle/Release	5	0	Columbia River ,RM 8 to RM 146 primarily in backwater, slough , estuarine habitats	April 1 through December 31 annually
Upper Columbia Steelhead ESU	Juvenile	Hatchery Adipose Clipped	Capture/Handle/Release	5	0	Columbia River ,RM 8 to RM 146 primarily in backwater, slough , estuarine habitats	April 1 through December 31 annually
Snake River Steelhead ESU	Juvenile	Natural	Capture/Handle/Release	5	0	Columbia River ,RM 8 to RM 146 primarily in backwater, slough , estuarine habitats	April 1 through December 31 annually
Snake River Steelhead ESU	Juvenile	Hatchery Adipose Clipped	Capture/Handle/Release	5	0	Columbia River ,RM 8 to RM 146 primarily in backwater, slough , estuarine habitats	April 1 through December 31 annually
Mid-Columbia Steelhead River ESU	Juvenile	Natural	Capture/Handle/Release	5	0	Columbia River ,RM 8 to RM 146 primarily in backwater, slough , estuarine habitats	April 1 through December 31 annually
Mid-Columbia Steelhead River ESU	Juvenile	Hatchery Adipose Clipped	Capture/Handle/Release	5	0	Columbia River ,RM 8 to RM 146 primarily in backwater, slough , estuarine habitats	April 1 through December 31 annually

## H2: Natural production of spring Chinook in the Mohawk system.

ESU/ Species and population group if appropriate	Life Stage	Origin	Take Activity	Number of Fish Requested	Requested Unintentional Mortality	Research Location	Research Period
Upper Willamette Spring Chinook Salmon ESU	Juvenile	Hatchery adipose intact	Capture/Handle/ Release	20	1	Mohawk River (McKenzie tributary) Rm 12 to rm 22	April 1 through June 30 annually
Upper Willamette Spring Chinook Salmon ESU	Juvenile	Hatchery adipose clipped	Capture/Handle/ Release	60	3	Mohawk River (McKenzie tributary) Rm 12 to rm 22	April 1 through June 30 annually

## H3: Genetic characterization of rainbow trout in the Upper Willamette System..

ESU/ Species and population group if appropriate	Life Stage	Origin	Take Activity	Number of Fish Requested	Requested Unintentional Mortality	Research Location	Research Period
Upper Willamette Spring Chinook Salmon ESU	Juvenile	Natural	Capture/Handle/ Release	30	1	Mainstem Willamette	March to May, Oct to December
Upper Willamette Spring Chinook Salmon ESU	Juvenile	Hatchery adipose clipped	Capture/Handle/ Release	60	3	Mainstem Willamette	March to May, Oct. to December
Upper Willamette Spring Chinook Salmon ESU	Juvenile	Natural	Capture/Handle/ Release	20	1	Mainstem Middle Fork Willamette to RM 75	March to May, Oct to December
Upper Willamette Spring Chinook Salmon ESU	Juvenile	Hatchery adipose clipped	Capture/Handle/ Release	30	1	Mainstem Middle Fork Willamette to RM 75	March to May, Oct to December
Upper Willamette Spring Chinook Salmon ESU	Juvenile	Natural	Capture/Handle/ Release	20	1	Coast Fork Willamette mainstem to Dorena Dam	March to May, Oct to December
Upper Willamette Spring Chinook Salmon ESU	Juvenile	Hatchery adipose clipped	Capture/Handle/ Release	20	1	Coast Fork Willamette mainstem to Dorena Dam	March to May, Oct to December

#### H4: District fish population sampling in the Upper Willamette Basin

ESU/ Species and population group if appropriate	Life Stage	Origin	Take Activity	Number of Fish Requested	Requested Unintentional Mortality	Research Location	Research Period
Upper Willamette Spring Chinook Salmon ESU	Juvenile	Natural	Capture/Handle/ Release	10	0	McKenzie River Rm 0 to rm 89	Year round
Upper Willamette Spring Chinook Salmon ESU	Juvenile	Hatchery adipose clipped	Capture/Handle/ Release	30	1	McKenzie River Rm 0 to rm 89	Year round
Upper Willamette Spring Chinook Salmon ESU	Juvenile	Natural	Capture/Handle/ Release	20	1	Middle Fork Willamette River Basin	Year round
Upper Willamette Spring Chinook Salmon ESU	Juvenile	Hatchery adipose clipped	Capture/Handle/ Release	30	1	Middle Fork Willamette River Basin	Year round
Upper Willamette Spring Chinook Salmon ESU	Juvenile	Natural	Capture/Handle/ Release	20	1	Coast Fork Willamette Basin	Year round
Upper Willamette Spring Chinook Salmon ESU	Juvenile	Hatchery adipose clipped	Capture/Handle/ Release	20	1	Coast Fork Willamette Basin	Year round

#### H5: Native rainbow (*Oncorhynchus mykiss*) and cutthroat (*O. clarki*) trout monitoring using passive integrated transponders (PIT tags) in the McKenzie River basin

ESU/ Species and population group if appropriate	Life Stage	Origin	Take Activity	Number of Fish Requested	Requested Unintentional Mortality	Research Location	Research Period
Upper Willamette Spring Chinook Salmon ESU	Juvenile	Natural	Capture/Handle/ Release	10	0	McKenzie River RM 0 to Blue River	Oct - April
Upper Willamette Spring Chinook Salmon ESU	Juvenile	Hatchery adipose clipped	Capture/Handle/ Release	30	1	McKenzie River RM 0 to Blue River	Oct - April

#### H6. Resident Redband Estimates on the Deschutes.

<b>ESU/ Species and population group if appropriate</b>	<b>Life Stage</b>	<b>Origin</b>	<b>Take Activity</b>	<b>Number of Fish Requested</b>	<b>Requested Unintentional Mortality</b>	<b>Research Location</b>	<b>Research Period</b>
Mid-Columbia Steelhead ESU	Juvenile	Natural	Capture/Handle /Release	20	1	Deschutes River mainstem Rm 34 to rm 87	February 20 through March 15
Mid-Columbia Steelhead ESU	Juvenile	Hatchery adipose clipped	Capture/Handle /Release	10	0	Deschutes River mainstem Rm 34 to rm 87	February 20 through March 15